

SEQUENCE LISTING

<110> Oppermann, Hermann
 Tai, Mei-Sheng
 McCartney, John

<120> Modified TGF-beta Superfamily Proteins

<130> STK-077

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<170> PatentIn Ver. 2.0

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<212> PRT

<213> Drosophila melanogaster

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Ala Pro Thr Arg Leu Gly Ala Leu Pro Val Leu Tyr His Leu Asn Asp
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Glu Asn Val Asn Leu Lys Lys Tyr Arg Asn Met Ile Val Lys Ser Cys
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Gly Cys His
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<210> 2

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Glu Lys Val Val Leu Lys Asn Tyr Gln Asp Met Val Val Glu Gly Cys
 20 25 30

Gly Cys Arg
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Lys Asn Val Val Leu Lys Val Tyr Pro Asn Met Thr Val Glu Ser Cys
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Ala Cys Arg
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1 5 10 15
Asp Lys Val Val Leu Lys Asn Tyr Gln Glu Met Val Val Glu Gly Cys
20 25 30
Gly Cys Arg
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Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val Arg Ser Cys
20 25 30
Gly Cys His
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1 5 10 15
Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val Arg Ala Cys
20 25 30
Gly Cys His
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<210> 7
<211> 36
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Val Pro Thr Lys Leu Ser Pro Ile Ser Val Leu Tyr Lys Asp Asp Met
1 5 10 15
Gly Val Pro Thr Leu Lys Tyr His Tyr Glu Gly Met Ser Val Ala Glu
20 25 30
Cys Gly Cys Arg
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<210> 8
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<400> 8
Val Pro Thr Lys Leu Glu Pro Ile Ser Ile Leu Tyr Leu Asp Lys Gly
1 5 10 15
Val Val Thr Tyr Lys Phe Lys Tyr Glu Gly Met Ala Val Ser Glu Cys
20 25 30
Gly Cys Arg
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<210> 9
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<213> Homo sapiens

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Thr Pro Thr Lys Met Ser Pro Ile Asn Met Leu Tyr Phe Asn Asp Lys
1 5 10 15
Gln Gln Ile Ile Tyr Gly Lys Ile Pro Gly Met Val Val Asp Arg Cys
20 25 30
Gly Cys Ser
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<210> 10
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<212> PRT
<213> Bos taurus

<220>
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<400> 10
Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile Asp Ala Gly
1 5 10 15
Asn Asn Val Val Tyr Asn Glu Tyr Glu Glu Met Val Val Glu Ser Cys
20 25 30
Gly Cys Arg
35

<210> 11
<211> 36
<212> PRT
<213> Gallus gallus

<220>
<223> Dorsalin

<400> 11
Val Pro Thr Lys Leu Asp Ala Ile Ser Ile Leu Tyr Lys Asp Asp Ala
1 5 10 15
Gly Val Pro Thr Leu Ile Tyr Asn Tyr Glu Gly Met Lys Val Ala Glu
20 25 30
Cys Gly Cys Arg
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<210> 12
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<212> PRT
<213> Drosophila melanogaster

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<400> 12
Val Pro Thr Gln Leu Asp Ser Val Ala Met Leu Tyr Leu Asn Asp Gln
1 5 10 15
Ser Thr Val Val Leu Lys Asn Tyr Gln Glu Met Thr Val Val Gly Cys
20 25 30
Gly Cys Arg
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<210> 13
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<212> PRT
<213> Mus musculus

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<400> 13
Val Pro Glu Arg Leu Ser Pro Ile Ser Val Leu Phe Phe Asp Asn Glu
1 5 10 15
Asp Asn Val Val Leu Arg His Tyr Glu Asp Met Val Val Asp Glu Cys
20 25 30
Gly Cys Arg
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<210> 14
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<213> Mus musculus

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Val Pro Thr Lys Leu Ser Pro Ile Ser Met Leu Tyr Gln Asp Ser Asp
1 5 10 15
Lys Asn Val Ile Leu Arg His Tyr Glu Asp Met Val Val Asp Glu Cys
20 25 30
Gly Cys Gly
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<210> 15
<211> 35

<212> PRT
<213> Homo sapiens

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1 5 10 15
Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val Glu Ser Cys
20 25 30
Gly Cys Arg
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<210> 16
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Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile Asp Ala Gly
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Gly Cys Arg
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Val Pro Ala Arg Leu Ser Pro Ile Ser Ile Leu Tyr Ile Asp Ala Ala
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20 25 30
Gly Cys Arg
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<210> 18
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<212> PRT
<213> Mus musculus

<220>
<223> GDF-9

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Val Pro Gly Lys Tyr Ser Pro Leu Ser Val Leu Thr Ile Glu Pro Asp
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Gly Ser Ile Ala Tyr Lys Glu Tyr Glu Asp Met Ile Ala Thr Arg Cys
20 25 30
Thr Cys Arg
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<210> 19
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<213> Homo sapiens

<220>
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Arg Pro Ile Ala Phe Asp Asp Asp Leu Ser Phe Leu Asp Asp Asn Leu
1 5 10 15
Val Tyr His Ile Leu Arg Lys His Ser Ala Lys Arg Cys Gly Cys Ile
20 25 30

<210> 20
<211> 38
<212> PRT
<213> Homo sapiens

<220>
<223> Inhibin Alpha

<400> 20
Ala Ala Leu Pro Gly Thr Met Arg Pro Leu His Val Arg Thr Thr Ser
1 5 10 15
Asp Gly Gly Tyr Ser Phe Lys Tyr Glu Thr Val Pro Asn Leu Leu Thr
20 25 30
Gln His Cys Ala Cys Ile
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<210> 21
<211> 35

<212> PRT
<213> Homo sapiens

<220>
<223> Inhibin BetaA

<400> 21
Val Pro Thr Lys Leu Arg Pro Met Ser Met Leu Tyr Tyr Asp Asp Gly
1 5 10 15
Gln Asn Ile Ile Lys Lys Asp Ile Gln Asn Met Ile Val Glu Glu Cys
20 25 30
Gly Cys Ser
35

<210> 22
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<212> PRT
<213> Homo sapiens

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<223> Inhibin BetaB

<400> 22
Ile Pro Thr Lys Leu Ser Thr Met Ser Met Leu Tyr Phe Asp Asp Glu
1 5 10 15
Tyr Asn Ile Val Lys Arg Asp Val Pro Asn Met Ile Val Glu Glu Cys
20 25 30
Gly Cys Ala
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<210> 23
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<212> PRT
<213> Homo sapiens

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<223> Inhibin BetaC

<400> 23
Val Pro Thr Ala Arg Arg Pro Leu Ser Leu Leu Tyr Tyr Asp Arg Asp
1 5 10 15
Ser Asn Ile Val Lys Thr Asp Ile Pro Asp Met Val Val Glu Ala Cys
20 25 30
Gly Cys Ser
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<210> 24
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<212> PRT
<213> Homo sapiens

<220>
<223> MIS

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Val Pro Thr Ala Tyr Ala Gly Lys Leu Leu Ile Ser Leu Ser Glu Glu
1 5 10 15
Arg Ile Ser Ala His His Val Pro Asn Met Val Ala Thr Glu Cys Gly
20 25 30
Cys Arg

<210> 25
<211> 34
<212> PRT
<213> Mus musculus

<220>
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<400> 25
Ala Pro Val Lys Thr Lys Pro Leu Ser Met Leu Tyr Val Asp Asn Gly
1 5 10 15
Arg Val Leu Leu Glu His His Lys Asp Met Ile Val Glu Glu Cys Gly
20 25 30
Cys Leu

<210> 26
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<212> PRT
<213> Homo sapiens

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<400> 26
Ala Pro Thr Lys Leu Ser Ala Thr Ser Val Leu Tyr Tyr Asp Ser Ser
1 5 10 15
Asn Asn Val Ile Leu Arg Lys His Arg Asn Met Val Val Lys Ala Cys
20 25 30
Gly Cys His
35

<210> 27
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<212> PRT
<213> Mus musculus

<220>
<223> OP-3

<400> 27
Val Pro Thr Glu Leu Ser Ala Ile Ser Leu Leu Tyr Tyr Asp Arg Asn
1 5 10 15
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20 25 30
Gly Cys His
35

<210> 28
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<212> PRT
<213> Drosophila melanogaster

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<223> Screw

<400> 28
Val Pro Thr Val Leu Gly Ala Ile Thr Ile Leu Arg Tyr Leu Asn Glu
1 5 10 15
Asp Ile Ile Asp Leu Thr Lys Tyr Gln Lys Ala Val Ala Lys Glu Cys
20 25 30
Gly Cys His
35

<210> 29
<211> 34
<212> PRT
<213> Homo sapiens

<220>
<223> TGF-Beta1

<400> 29
Val Pro Gln Ala Leu Glu Pro Leu Pro Ile Val Tyr Tyr Val Gly Arg
1 5 10 15
Lys Pro Lys Val Glu Gln Leu Ser Asn Met Ile Val Arg Ser Cys Lys
20 25 30
Cys Ser

<210> 30
<211> 34

<212> PRT
<213> Homo sapiens

<220>
<223> TGF-Beta2

<400> 30
Val Ser Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Ile Gly Lys
1 5 10 15
Thr Pro Lys Ile Glu Gln Leu Ser Asn Met Ile Val Lys Ser Cys Lys
20 25 30

Cys Ser

<210> 31
<211> 34
<212> PRT
<213> Homo sapiens

<220>
<223> TGF-Beta3

<400> 31
Val Pro Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Val Gly Arg
1 5 10 15
Thr Pro Lys Val Glu Gln Leu Ser Asn Met Val Val Lys Ser Cys Lys
20 25 30

Cys Ser

<210> 32
<211> 34
<212> PRT
<213> Gallus gallus

<220>
<223> TGF-Beta4

<400> 32
Val Pro Gln Thr Leu Asp Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
1 5 10 15
Asn Val Arg Val Glu Gln Leu Ser Asn Met Val Val Arg Ala Cys Lys
20 25 30

Cys Ser

<210> 33
<211> 34

<212> PRT
<213> *Xenopus laevis*

<220>
<223> TGF-Beta5

<400> 33
Val Pro Asp Val Leu Glu Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
1 5 10 15
Thr Ala Lys Val Glu Gln Leu Ser Asn Met Val Val Arg Ser Cys Asn
20 25 30
Cys Ser

<210> 34
<211> 35
<212> PRT
<213> *Strongylocentrotus purpuratus*

<220>
<223> UNIVIN

<400> 34
Ala Pro Thr Lys Leu Ser Gly Ile Ser Met Leu Tyr Phe Asp Asn Asn
1 5 10 15
Glu Asn Val Val Leu Arg Gln Tyr Glu Asp Met Val Val Glu Ala Cys
20 25 30
Gly Cys Arg
35

<210> 35
<211> 35
<212> PRT
<213> *Xenopus laevis*

<220>
<223> VG-1

<400> 35
Val Pro Thr Lys Met Ser Pro Ile Ser Met Leu Phe Tyr Asp Asn Asn
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Asp Asn Val Val Leu Arg His Tyr Glu Asn Met Ala Val Asp Glu Cys
20 25 30
Gly Cys Arg
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<210> 36
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<212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:synthetic
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<220>
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 <222> (1)..(21)

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 Met Ser Thr Gly Ser Lys Gln
 1 5

<210> 37
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 <212> PRT
 <213> Artificial Sequence

<400> 37
 Met Ser Thr Gly Ser Lys Gln
 1 5

<210> 38
 <211> 1822
 <212> DNA
 <213> Homo sapiens

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 <222> (49)..(1341)
 <223> Morphogenic Protein OP1

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 Met His Val
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cgc tca ctg cga gct gcg gcg ccg cac agc ttc gtg gcg ctc tgg gca 105
 Arg Ser Leu Arg Ala Ala Ala Pro His Ser Phe Val Ala Leu Trp Ala
 5 10 15

ccc ctg ttc ctg ctg cgc tcc gcc ctg gcc gac ttc agc ctg gac aac 153
 Pro Leu Phe Leu Leu Arg Ser Ala Leu Ala Asp Phe Ser Leu Asp Asn
 20 25 30 35

gag gtg cac tcg agc ttc atc cac cgg cgc ctc cgc agc cag gag cgg 201
 Glu Val His Ser Ser Phe Ile His Arg Arg Leu Arg Ser Gln Glu Arg
 40 45 50

cgg gag atg cag cgc gag atc ctc tcc att ttg ggc ttg ccc cac cgc 249
 Arg Glu Met Gln Arg Glu Ile Leu Ser Ile Leu Gly Leu Pro His Arg
 55 60 65

cgg tcc acg ggg agc aaa cag cgc agc cag aac cgc tcc aag acg ccc 969
 Arg Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro
 295 300 305

 aag aac cag gaa gcc ctg cgg atg gcc aac gtg gca gag aac agc agc 1017
 Lys Asn Gln Glu Ala Leu Arg Met Ala Asn Val Ala Glu Asn Ser Ser
 310 315 320

 agc gac cag agg cag gcc tgt aag aag cac gag ctg tat gtc agc ttc 1065
 Ser Asp Gln Arg Gln Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe
 325 330 335

 cga gac ctg ggc tgg cag gac tgg atc atc gcg cct gaa ggc tac gcc 1113
 Arg Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala
 340 345 350 355

 gcc tac tac tgt gag ggg gag tgt gcc ttc cct ctg aac tcc tac atg 1161
 Ala Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met
 360 365 370

 aac gcc acc aac cac gcc atc gtg cag acg ctg gtc cac ttc atc aac 1209
 Asn Ala Thr Asn His Ala Ile Val Gln Thr Leu Val His Phe Ile Asn
 375 380 385

 ccg gaa acg gtg ccc aag ccc tgc tgt gcg ccc acg cag ctc aat gcc 1257
 Pro Glu Thr Val Pro Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala
 390 395 400

 atc tcc gtc ctc tac ttc gat gac agc tcc aac gtc atc ctg aag aaa 1305
 Ile Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys
 405 410 415

 tac aga aac atg gtg gtc cgg gcc tgt ggc tgc cac tagctcctcc 1351
 Tyr Arg Asn Met Val Val Arg Ala Cys Gly Cys His
 420 425 430

 gagaattcag accctttggg gccaaagtttt tctggatcct ccattgctcg ccttggccag 1411
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 gcataaagaa aaatggccgg gccaggtcac tggctgggaa gtctcagcca tgcacggact 1651
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 ggcgtggcaa ggggtgggca cattggtgtc tgtgcgaaag gaaaattgac ccggaagttc 1771
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<210> 39
 <211> 431
 <212> PRT
 <213> Homo sapiens

<400> 39

Met His Val Arg Ser Leu Arg Ala Ala Ala Pro His Ser Phe Val Ala
1 5 10 15

Leu Trp Ala Pro Leu Phe Leu Leu Arg Ser Ala Leu Ala Asp Phe Ser
20 25 30

Leu Asp Asn Glu Val His Ser Ser Phe Ile His Arg Arg Leu Arg Ser
35 40 45

Gln Glu Arg Arg Glu Met Gln Arg Glu Ile Leu Ser Ile Leu Gly Leu
50 55 60

Pro His Arg Pro Arg Pro His Leu Gln Gly Lys His Asn Ser Ala Pro
65 70 75 80

Met Phe Met Leu Asp Leu Tyr Asn Ala Met Ala Val Glu Glu Gly Gly
85 90 95

Gly Pro Gly Gly Gln Gly Phe Ser Tyr Pro Tyr Lys Ala Val Phe Ser
100 105 110

Thr Gln Gly Pro Pro Leu Ala Ser Leu Gln Asp Ser His Phe Leu Thr
115 120 125

Asp Ala Asp Met Val Met Ser Phe Val Asn Leu Val Glu His Asp Lys
130 135 140

Glu Phe Phe His Pro Arg Tyr His His Arg Glu Phe Arg Phe Asp Leu
145 150 155 160

Ser Lys Ile Pro Glu Gly Glu Ala Val Thr Ala Ala Glu Phe Arg Ile
165 170 175

Tyr Lys Asp Tyr Ile Arg Glu Arg Phe Asp Asn Glu Thr Phe Arg Ile
180 185 190

Ser Val Tyr Gln Val Leu Gln Glu His Leu Gly Arg Glu Ser Asp Leu
195 200 205

Phe Leu Leu Asp Ser Arg Thr Leu Trp Ala Ser Glu Glu Gly Trp Leu
210 215 220

Val Phe Asp Ile Thr Ala Thr Ser Asn His Trp Val Val Asn Pro Arg
225 230 235 240

His Asn Leu Gly Leu Gln Leu Ser Val Glu Thr Leu Asp Gly Gln Ser
245 250 255

Ile Asn Pro Lys Leu Ala Gly Leu Ile Gly Arg His Gly Pro Gln Asn
260 265 270

Lys Gln Pro Phe Met Val Ala Phe Phe Lys Ala Thr Glu Val His Phe
275 280 285

Arg Ser Ile Arg Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser

290					295					300					
Lys	Thr	Pro	Lys	Asn	Gln	Glu	Ala	Leu	Arg	Met	Ala	Asn	Val	Ala	Glu
305					310					315					320
Asn	Ser	Ser	Ser	Asp	Gln	Arg	Gln	Ala	Cys	Lys	Lys	His	Glu	Leu	Tyr
				325					330					335	
Val	Ser	Phe	Arg	Asp	Leu	Gly	Trp	Gln	Asp	Trp	Ile	Ile	Ala	Pro	Glu
			340					345					350		
Gly	Tyr	Ala	Ala	Tyr	Tyr	Cys	Glu	Gly	Glu	Cys	Ala	Phe	Pro	Leu	Asn
		355					360					365			
Ser	Tyr	Met	Asn	Ala	Thr	Asn	His	Ala	Ile	Val	Gln	Thr	Leu	Val	His
	370					375					380				
Phe	Ile	Asn	Pro	Glu	Thr	Val	Pro	Lys	Pro	Cys	Cys	Ala	Pro	Thr	Gln
385					390					395					400
Leu	Asn	Ala	Ile	Ser	Val	Leu	Tyr	Phe	Asp	Asp	Ser	Ser	Asn	Val	Ile
				405					410					415	
Leu	Lys	Lys	Tyr	Arg	Asn	Met	Val	Val	Arg	Ala	Cys	Gly	Cys	His	
			420					425					430		

<210> 40

<211> 98

<212> PRT

<213> Homo sapiens

<220>

<223> TGF-Betal

<400> 40

Cys	Cys	Val	Arg	Gln	Leu	Tyr	Ile	Asp	Phe	Arg	Lys	Asp	Leu	Gly	Trp
1				5					10					15	

Lys	Trp	Ile	His	Glu	Pro	Lys	Gly	Tyr	His	Ala	Asn	Phe	Cys	Leu	Gly
			20					25					30		

Pro	Cys	Pro	Tyr	Ile	Trp	Ser	Leu	Asp	Thr	Gln	Tyr	Ser	Lys	Val	Leu
		35					40					45			

Ala	Leu	Tyr	Asn	Gln	His	Asn	Pro	Gly	Ala	Ser	Ala	Ala	Pro	Cys	Cys
	50					55					60				

Val	Pro	Gln	Ala	Leu	Glu	Pro	Leu	Pro	Ile	Val	Tyr	Tyr	Val	Gly	Arg
65					70					75					80

Lys	Pro	Lys	Val	Glu	Gln	Leu	Ser	Asn	Met	Ile	Val	Arg	Ser	Cys	Lys
				85					90					95	

Cys Ser

<210> 41
 <211> 98
 <212> PRT
 <213> Homo sapiens

<220>
 <223> TGF-Beta2

<400> 41
 Cys Cys Leu Arg Pro Leu Tyr Ile Asp Phe Lys Arg Asp Leu Gly Trp
 1 5 10 15
 Lys Trp Ile His Glu Pro Lys Gly Tyr Asn Ala Asn Phe Cys Ala Gly
 20 25 30
 Ala Cys Pro Tyr Leu Trp Ser Ser Asp Thr Gln His Ser Arg Val Leu
 35 40 45
 Ser Leu Tyr Asn Thr Ile Asn Pro Glu Ala Ser Ala Ser Pro Cys Cys
 50 55 60
 Val Ser Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Ile Gly Lys
 65 70 75 80
 Thr Pro Lys Ile Glu Gln Leu Ser Asn Met Ile Val Lys Ser Cys Lys
 85 90 95
 Cys Ser

<210> 42
 <211> 98
 <212> PRT
 <213> Homo sapiens

<220>
 <223> TGF-Beta3

<400> 42
 Cys Cys Val Arg Pro Leu Tyr Ile Asp Phe Arg Gln Asp Leu Gly Trp
 1 5 10 15
 Lys Trp Val His Glu Pro Lys Gly Tyr Tyr Ala Asn Phe Cys Ser Gly
 20 25 30
 Pro Cys Pro Tyr Leu Arg Ser Ala Asp Thr Thr His Ser Thr Val Leu
 35 40 45
 Gly Leu Tyr Asn Thr Leu Asn Pro Glu Ala Ser Ala Ser Pro Cys Cys
 50 55 60
 Val Pro Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Val Gly Arg
 65 70 75 80
 Thr Pro Lys Val Glu Gln Leu Ser Asn Met Val Val Lys Ser Cys Lys

85

90

95

Cys Ser

<210> 43

<211> 98

<212> PRT

<213> Gallus gallus

<220>

<223> TGF-Beta4

<400> 43

Cys	Cys	Val	Arg	Pro	Leu	Tyr	Ile	Asp	Phe	Arg	Lys	Asp	Leu	Gln	Trp
1				5					10					15	

Lys	Trp	Ile	His	Glu	Pro	Lys	Gly	Tyr	Met	Ala	Asn	Phe	Cys	Met	Gly
			20					25					30		

Pro	Cys	Pro	Tyr	Ile	Trp	Ser	Ala	Asp	Thr	Gln	Tyr	Thr	Lys	Val	Leu
		35					40					45			

Ala	Leu	Tyr	Asn	Gln	His	Asn	Pro	Gly	Ala	Ser	Ala	Ala	Pro	Cys	Cys
	50					55					60				

Val	Pro	Gln	Thr	Leu	Asp	Pro	Leu	Pro	Ile	Ile	Tyr	Tyr	Val	Gly	Arg
65					70					75					80

Asn	Val	Arg	Val	Glu	Gln	Leu	Ser	Asn	Met	Val	Val	Arg	Ala	Cys	Lys
				85					90					95	

Cys Ser

<210> 44

<211> 98

<212> PRT

<213> Xenopus laevis

<220>

<223> TGF-Beta5

<400> 44

Cys	Cys	Val	Lys	Pro	Leu	Tyr	Ile	Asn	Phe	Arg	Lys	Asp	Leu	Gly	Trp
1				5					10					15	

Lys	Trp	Ile	His	Glu	Pro	Lys	Gly	Tyr	Glu	Ala	Asn	Tyr	Cys	Leu	Gly
			20					25					30		

Asn	Cys	Pro	Tyr	Ile	Trp	Ser	Met	Asp	Thr	Gln	Tyr	Ser	Lys	Val	Leu
		35					40					45			

Ser	Leu	Tyr	Asn	Gln	Asn	Asn	Pro	Gly	Ala	Ser	Ile	Ser	Pro	Cys	Cys
	50					55					60				

Val Pro Asp Val Leu Glu Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
65 70 75 80

Thr Ala Lys Val Glu Gln Leu Ser Asn Met Val Val Arg Ser Cys Asn
85 90 95

Cys Ser

<210> 45
<211> 102
<212> PRT
<213> *Drosophila melanogaster*

<220>
<223> DPP

<400> 45
Cys Arg Arg His Ser Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asp
1 5 10 15

Asp Trp Ile Val Ala Pro Leu Gly Tyr Asp Ala Tyr Tyr Cys His Gly
20 25 30

Lys Cys Pro Phe Pro Leu Ala Asp His Phe Asn Ser Thr Asn His Ala
35 40 45

Val Val Gln Thr Leu Val Asn Asn Met Asn Pro Gly Lys Val Pro Lys
50 55 60

Ala Cys Cys Val Pro Thr Gln Leu Asp Ser Val Ala Met Leu Tyr Leu
65 70 75 80

Asn Asp Gln Ser Thr Val Val Leu Lys Asn Tyr Gln Glu Met Thr Val
85 90 95

Val Gly Cys Gly Cys Arg
100

<210> 46
<211> 102
<212> PRT
<213> *Xenopus laevis*

<220>
<223> VG1

<400> 46
Cys Lys Lys Arg His Leu Tyr Val Glu Phe Lys Asp Val Gly Trp Gln
1 5 10 15

Asn Trp Val Ile Ala Pro Gln Gly Tyr Met Ala Asn Tyr Cys Tyr Gly
20 25 30

Glu Cys Pro Tyr Pro Leu Thr Glu Ile Leu Asn Gly Ser Asn His Ala
35 40 45
Ile Leu Gln Thr Leu Val His Ser Ile Glu Pro Glu Asp Ile Pro Leu
50 55 60
Pro Cys Cys Val Pro Thr Lys Met Ser Pro Ile Ser Met Leu Phe Tyr
65 70 75 80
Asp Asn Asn Asp Asn Val Val Leu Arg His Tyr Glu Asn Met Ala Val
85 90 95
Asp Glu Cys Gly Cys Arg
100

<210> 47
<211> 102
<212> PRT
<213> Mus musculus

<220>
<223> VGR1

<400> 47
Cys Lys Lys His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Gln
1 5 10 15
Asp Trp Ile Ile Ala Pro Lys Gly Tyr Ala Ala Asn Tyr Cys Asp Gly
20 25 30
Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val His Leu Met Asn Pro Glu Tyr Val Pro Lys
50 55 60
Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80
Asp Asp Asn Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95
Arg Ala Cys Gly Cys His
100

<210> 48
<211> 118
<212> PRT
<213> Drosophila melanogaster

<220>
<223> 60A

<400> 48
Cys Gln Met Gln Thr Leu Tyr Ile Asp Phe Lys Asp Leu Gly Trp His

1 5 10 15
 Asp Trp Ile Ile Ala Pro Glu Gly Tyr Gly Ala Phe Tyr Cys Ser Gly
 20 25 30
 Glu Cys Asn Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
 35 40 45
 Ile Val Gln Thr Leu Val His Leu Leu Glu Pro Lys Lys Val Pro Lys
 50 55 60
 Pro Cys Cys Ala Pro Thr Arg Leu Gly Ala Leu Pro Val Leu Tyr His
 65 70 75 80
 Pro Cys Cys Ala Pro Thr Arg Leu Gly Ala Leu Pro Val Leu Tyr His
 85 90 95
 Leu Asn Asp Glu Asn Val Asn Leu Lys Lys Tyr Arg Asn Met Ile Val
 100 105 110
 Lys Ser Cys Gly Cys His
 115

<210> 49
 <211> 101
 <212> PRT
 <213> Homo sapiens

<220>
 <223> BMP-2A

<400> 49
 Cys Lys Arg His Pro Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asn
 1 5 10 15
 Asp Trp Ile Val Ala Pro Pro Gly Tyr His Ala Phe Tyr Cys His Gly
 20 25 30
 Glu Cys Pro Phe Pro Leu Ala Asp His Leu Asn Ser Thr Asn His Ala
 35 40 45
 Ile Val Gln Thr Leu Val Asn Ser Val Asn Ser Lys Ile Pro Lys Ala
 50 55 60
 Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Met Leu Tyr Leu Asp
 65 70 75 80
 Glu Asn Glu Lys Val Val Leu Lys Asn Tyr Gln Asp Met Val Val Glu
 85 90 95
 Gly Cys Gly Cys Arg
 100

<210> 50
 <211> 103

<212> PRT
<213> Homo sapiens

<220>
<223> BMP3

<400> 50
Cys Ala Arg Arg Tyr Leu Lys Val Asp Phe Ala Asp Ile Gly Trp Ser
1 5 10 15
Glu Trp Ile Ile Ser Pro Lys Ser Phe Asp Ala Tyr Tyr Cys Ser Gly
20 25 30
Ala Cys Gln Phe Pro Met Pro Lys Ser Leu Lys Pro Ser Asn His Ala
35 40 45
Thr Ile Gln Ser Ile Val Arg Ala Val Gly Val Val Pro Gly Ile Pro
50 55 60
Glu Pro Cys Cys Val Pro Glu Lys Met Ser Ser Leu Ser Ile Leu Phe
65 70 75 80
Phe Asp Glu Asn Lys Asn Val Val Leu Lys Val Tyr Pro Asn Met Thr
85 90 95
Val Glu Ser Cys Ala Cys Arg
100

<210> 51
<211> 101
<212> PRT
<213> Homo sapiens

<220>
<223> BMP-4

<400> 51
Cys Arg Arg His Ser Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asn
1 5 10 15
Asp Trp Ile Val Ala Pro Pro Gly Tyr Gln Ala Phe Tyr Cys His Gly
20 25 30
Asp Cys Pro Phe Pro Leu Ala Asp His Leu Asn Ser Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val Asn Ser Val Asn Ser Ser Ile Pro Lys Ala
50 55 60
Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Met Leu Tyr Leu Asp
65 70 75 80
Glu Tyr Asp Lys Val Val Leu Lys Asn Tyr Gln Glu Met Val Val Glu
85 90 95
Gly Cys Gly Cys Arg

100

<210> 52
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> BMP-5

<400> 52
Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln
1 5 10 15
Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Phe Tyr Cys Asp Gly
20 25 30
Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val His Leu Met Phe Pro Asp His Val Pro Lys
50 55 60
Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80
Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95
Arg Ser Cys Gly Cys His
100

<210> 53
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> BMP-6

<400> 53
Cys Arg Lys His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Gln
1 5 10 15
Asp Trp Ile Ile Ala Pro Lys Gly Tyr Ala Ala Asn Tyr Cys Asp Gly
20 25 30
Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val His Leu Met Asn Pro Glu Tyr Val Pro Lys
50 55 60
Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80

Asp Asp Asn Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95

Arg Ala Cys Gly Cys His
100

<210> 54
<211> 103
<212> PRT
<213> Gallus gallus

<220>
<223> DORSALIN

<400> 54
Cys Arg Arg Thr Ser Leu His Val Asn Phe Lys Glu Ile Gly Trp Asp
1 5 10 15

Ser Trp Ile Ile Ala Pro Lys Asp Tyr Glu Ala Phe Glu Cys Lys Gly
20 25 30

Gly Cys Phe Phe Pro Leu Thr Asp Asn Val Thr Pro Thr Lys His Ala
35 40 45

Ile Val Gln Thr Leu Val His Leu Gln Asn Pro Lys Lys Ala Ser Lys
50 55 60

Ala Cys Cys Val Pro Thr Lys Leu Asp Ala Ile Ser Ile Leu Tyr Lys
65 70 75 80

Asp Asp Ala Gly Val Pro Thr Leu Ile Tyr Asn Tyr Glu Gly Met Lys
85 90 95

Val Ala Glu Cys Gly Cys Arg
100

<210> 55
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> OP-1

<400> 55
Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln
1 5 10 15

Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly
20 25 30

Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn Ala Thr Asn His Ala
35 40 45

Ile Val Gln Thr Leu Val His Phe Ile Asn Pro Glu Thr Val Pro Lys
50 55 60

Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80

Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95

Arg Ala Cys Gly Cys His
100

<210> 56
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> OP-2

<400> 56
Cys Arg Arg His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Leu
1 5 10 15

Asp Trp Val Ile Ala Pro Gln Gly Tyr Ser Ala Tyr Tyr Cys Glu Gly
20 25 30

Glu Cys Ser Phe Pro Leu Asp Ser Cys Met Asn Ala Thr Asn His Ala
35 40 45

Ile Leu Gln Ser Leu Val His Leu Met Lys Pro Asn Ala Val Pro Lys
50 55 60

Ala Cys Cys Ala Pro Thr Lys Leu Ser Ala Thr Ser Val Leu Tyr Tyr
65 70 75 80

Asp Ser Ser Asn Asn Val Ile Leu Arg Lys His Arg Asn Met Val Val
85 90 95

Lys Ala Cys Gly Cys His
100

<210> 57
<211> 102
<212> PRT
<213> Mus musculus

<220>
<223> OP-3

<400> 57
Cys Arg Arg His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Leu
1 5 10 15

Asp Ser Val Ile Ala Pro Gln Gly Tyr Ser Ala Tyr Tyr Cys Ala Gly

	20		25		30
Glu Cys Ile Tyr Pro Leu Asn Ser Cys Met Asn Ser Thr Asn His Ala	35	40	45		
Thr Met Gln Ala Leu Val His Leu Met Lys Pro Asp Ile Ile Pro Lys	50	55	60		
Val Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Leu Leu Tyr Tyr	65	70	75	80	
Asp Arg Asn Asn Asn Val Ile Leu Arg Arg Glu Arg Asn Met Val Val	85	90	95		
Gln Ala Cys Gly Cys His	100				

<210> 58
 <211> 107
 <212> PRT
 <213> Mus musculus

<220>
 <223> GDF-1

<400> 58
Cys Arg Thr Arg Arg Leu His Val Ser Phe Arg Glu Val Gly Trp His
1 5 10 15
Arg Trp Val Ile Ala Pro Arg Gly Phe Leu Ala Asn Phe Cys Gln Gly
20 25 30
Thr Cys Ala Leu Pro Glu Thr Leu Arg Gly Pro Gly Gly Pro Pro Ala
35 40 45
Leu Asn His Ala Val Leu Arg Ala Leu Met His Ala Ala Ala Pro Thr
50 55 60
Pro Gly Ala Gly Ser Pro Cys Cys Val Pro Glu Arg Leu Ser Pro Ile
65 70 75 80
Ser Val Leu Phe Phe Asp Asn Ser Asp Asn Val Val Leu Arg His Tyr
85 90 95
Glu Asp Met Val Val Asp Glu Cys Gly Cys Arg
100 105

<210> 59
 <211> 101
 <212> PRT
 <213> Mus musculus

<220>
 <223> GDF-3

<400> 59

Cys His Arg His Gln Leu Phe Ile Asn Phe Gln Asp Leu Gly Trp His
1 5 10 15

Lys Trp Val Ile Ala Pro Lys Gly Phe Met Ala Asn Tyr Cys His Gly
20 25 30

Glu Cys Pro Phe Ser Met Thr Thr Tyr Leu Asn Ser Ser Asn Tyr Ala
35 40 45

Phe Met Gln Ala Leu Met His Met Ala Asp Pro Lys Val Pro Lys Ala
50 55 60

Val Cys Val Pro Thr Lys Leu Ser Pro Ile Ser Met Leu Tyr Gln Asp
65 70 75 80

Ser Asp Lys Asn Val Ile Leu Arg His Tyr Glu Asp Met Val Val Asp
85 90 95

Glu Cys Gly Cys Gly
100

<210> 60

<211> 102

<212> PRT

<213> Mus musculus

<220>

<223> GDF-9

<400> 60

Cys Glu Leu His Asp Phe Arg Leu Ser Phe Ser Gln Leu Lys Trp Asp
1 5 10 15

Asn Trp Ile Val Ala Pro His Arg Tyr Asn Pro Arg Tyr Cys Lys Gly
20 25 30

Asp Cys Pro Arg Ala Val Arg His Arg Tyr Gly Ser Pro Val His Thr
35 40 45

Met Val Gln Asn Ile Ile Tyr Glu Lys Leu Asp Pro Ser Val Pro Arg
50 55 60

Pro Ser Cys Val Pro Gly Lys Tyr Ser Pro Leu Ser Val Leu Thr Ile
65 70 75 80

Glu Pro Asp Gly Ser Ile Ala Tyr Lys Glu Tyr Glu Asp Met Ile Ala
85 90 95

Thr Arg Cys Thr Cys Arg
100

<210> 61

<211> 105

<212> PRT

<213> Homo sapiens

<220>

<223> INHIBIN-Alpha

<400> 61

Cys His Arg Val Ala Leu Asn Ile Ser Phe Gln Glu Leu Gly Trp Glu
1 5 10 15

Arg Trp Ile Val Tyr Pro Pro Ser Phe Ile Phe His Tyr Cys His Gly
20 25 30

Gly Cys Gly Leu His Ile Pro Pro Asn Leu Ser Leu Pro Val Pro Gly
35 40 45

Ala Pro Pro Thr Pro Ala Gln Pro Tyr Ser Leu Leu Pro Gly Ala Gln
50 55 60

Pro Cys Cys Ala Ala Leu Pro Gly Thr Met Arg Pro Leu His Val Arg
65 70 75 80

Thr Thr Ser Asp Gly Gly Tyr Ser Phe Lys Tyr Glu Thr Val Pro Asn
85 90 95

Leu Leu Thr Gln His Cys Ala Cys Ile
100 105

<210> 62

<211> 106

<212> PRT

<213> Bos taurus

<220>

<223> INHIBIN-BetaA

<400> 62

Cys Cys Lys Lys Gln Phe Phe Val Ser Phe Lys Asp Ile Gly Trp Asn
1 5 10 15

Asp Trp Ile Ile Ala Pro Ser Gly Tyr His Ala Asn Tyr Cys Glu Gly
20 25 30

Glu Cys Pro Ser His Ile Ala Gly Thr Ser Gly Ser Ser Leu Ser Phe
35 40 45

His Ser Thr Val Ile Asn His Tyr Arg Met Arg Gly His Ser Pro Phe
50 55 60

Ala Asn Leu Lys Ser Cys Cys Val Pro Thr Lys Leu Arg Pro Met Ser
65 70 75 80

Met Leu Tyr Tyr Asp Asp Gly Gln Asn Ile Ile Lys Lys Asp Ile Gln
85 90 95

Asn Met Ile Val Glu Glu Cys Gly Cys Ser
100 105

<210> 63
 <211> 106
 <212> PRT
 <213> Homo sapiens

<220>
 <223> INHIBIN-BetaB

<400> 63
 Cys Cys Lys Lys Gln Phe Phe Val Ser Phe Lys Asp Ile Gly Trp Asn
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Ser Gly Tyr His Ala Asn Tyr Cys Glu Gly
 20 25 30
 Glu Cys Pro Ser His Ile Ala Gly Thr Ser Gly Ser Ser Leu Ser Phe
 35 40 45
 His Ser Thr Val Ile Asn His Tyr Arg Met Arg Gly His Ser Pro Phe
 50 55 60
 Ala Asn Leu Lys Ser Cys Cys Val Pro Thr Lys Leu Arg Pro Met Ser
 65 70 75 80
 Met Leu Tyr Tyr Asp Asp Gly Gln Asn Ile Ile Lys Lys Asp Ile Gln
 85 90 95
 Asn Met Ile Val Glu Glu Cys Gly Cys Ser
 100 105

<210> 64
 <211> 98
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: TGF-B
 SUBGROUP SEQUENCE PATTERN

<220>
 <223> Each Xaa is independently selected from a group of
 one or more specified amino acids as defined in
 the specification

<400> 64
 Cys Cys Val Arg Pro Leu Tyr Ile Asp Phe Arg Xaa Asp Leu Gly Trp
 1 5 10 15
 Lys Trp Ile His Glu Pro Lys Gly Tyr Xaa Ala Asn Phe Cys Xaa Gly
 20 25 30
 Xaa Cys Pro Tyr Xaa Trp Ser Xaa Asp Thr Gln Xaa Ser Xaa Val Leu
 35 40 45

Xaa Leu Tyr Asn Xaa Xaa Asn Pro Xaa Ala Ser Ala Xaa Pro Cys Cys
50 55 60

Val Pro Gln Xaa Leu Glu Pro Leu Xaa Ile Xaa Tyr Tyr Val Gly Arg
65 70 75 80

Xaa Xaa Lys Val Glu Gln Leu Ser Asn Met Xaa Val Xaa Ser Cys Lys
85 90 95

Cys Ser

<210> 65
<211> 104
<212> PRT
<213> Artificial Sequence

<220>
<223> Each Xaa is independently selected from a group of
one or more specified amino acids as defined in
the specification

<220>
<223> Description of Artificial Sequence: VG/DPP
SUBGROUP SEQUENCE PATTERN

<400> 65
Cys Xaa Xaa Xaa Xaa Leu Tyr Val Xaa Phe Xaa Asp Xaa Gly Trp Xaa
1 5 10 15

Asp Trp Ile Ile Ala Pro Xaa Gly Tyr Xaa Ala Xaa Tyr Cys Xaa Gly
20 25 30

Xaa Cys Xaa Phe Pro Leu Xaa Xaa Xaa Xaa Asn Xaa Thr Asn His Ala
35 40 45

Ile Xaa Gln Thr Leu Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Pro
50 55 60

Lys Xaa Cys Cys Xaa Pro Thr Xaa Leu Xaa Ala Xaa Ser Xaa Leu Tyr
65 70 75 80

Xaa Asp Xaa Xaa Xaa Xaa Xaa Val Xaa Leu Xaa Xaa Tyr Xaa Xaa Met
85 90 95

Xaa Val Xaa Xaa Cys Gly Cys Xaa
100

<210> 66
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: GDF SUBGROUP

PATTERN

<220>

<223> Each Xaa is independently selected from a group of one or more specified amino acids as defined in the specification

<400> 66

```

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Xaa Xaa Xaa Xaa Trp Xaa
 1           5           10           15

Xaa Trp Xaa Xaa Ala Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa Gly
          20           25           30

Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          35           40           45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          50           55           60

Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Val Pro Xaa Xaa Xaa Ser Pro Xaa
65           70           75           80

Ser Xaa Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr
          85           90           95

Glu Asp Met Xaa Xaa Xaa Xaa Cys Xaa Cys Xaa
          100           105

```

<210> 67

<211> 109

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: INHIBIN
SUBGROUP PATTERN

<220>

<223> Each Xaa is independently selected from a group of one or more specified amino acids as defined in the specification

<400> 67

```

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Xaa Xaa Xaa Gly Trp Xaa
 1           5           10           15

Xaa Trp Ile Xaa Xaa Pro Xaa Xaa Xaa Xaa Xaa Xaa Tyr Cys Xaa Gly
          20           25           30

Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          35           40           45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          50           55           60

```


Xaa Xaa Xaa Xaa Xaa Cys Cys Xaa Xaa Xaa Pro Xaa Xaa Xaa Xaa Xaa
65 70 75 80

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
85 90 95

Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa Cys Xaa Cys Xaa
100 105

<210> 68

<211> 139

<212> PRT

<213> Homo sapiens

<220>

<223> Mature H2223 mutant

<400> 68

Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro Lys
1 5 10 15

Asn Gln Glu Ala Leu Arg Met Ala Asn Val Ala Glu Asn Ser Ser Ser
20 25 30

Asp Gln Arg Gln Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg
35 40 45

Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala
50 55 60

Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn
65 70 75 80

Ala Thr Asn His Ala Ile Val Gln Thr Leu Val His Phe Ile Asn Pro
85 90 95

Glu Thr Val Pro Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile
100 105 110

Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr
115 120 125

Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg
130 135

<210> 69

<211> 117

<212> PRT

<213> Homo sapiens

<220>

<223> Trypsin truncated H2223 mutant

<400> 69

Met Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala Cys

```

      1             5             10             15
Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln Asp
      20             25             30
Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly Glu
      35             40             45
Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn Ala Thr Asn His Ala Ile
      50             55             60
Val Gln Thr Leu Val His Phe Ile Asn Pro Glu Thr Val Pro Lys Pro
      65             70             75             80
Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr Phe Asp
      85             90             95
Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val Val Glu
      100            105            110
Ala Cys Gly Cys Arg
      115

```

```

<210> 70
<211> 33
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence: Primer #1

```

```

<220>
<221> CDS
<222> (1)..(33)

```

```

<400> 70
gcg ccc acg cag ctc agc gct atc tcc gtc ctc
Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu
      1             5             10

```

33

```

<210> 71
<211> 11
<212> PRT
<213> Artificial Sequence

```

```

<400> 71
Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu
      1             5             10

```

```

<210> 72
<211> 43
<212> DNA
<213> Artificial Sequence

```

<220>

<223> Description of Artificial Sequence: Primer #2

<400> 72

ctatctgcag ccacaagctt cgaccacat gtcttcgtat ttc

43

<210> 73

<211> 43

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:complement of
Primer #2

<220>

<221> CDS

<222> (2)..(43)

<400> 73

g aaa tac gaa gac atg gtg gtc gaa gct tgt ggc tgc aga tag

43

Lys Tyr Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg

1

5

10

<210> 74

<211> 13

<212> PRT

<213> Artificial Sequence

<400> 74

Lys Tyr Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg

1

5

10

<210> 75

<211> 44

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:the sequence
between the T7 promoter, at the XbaI site, and the
ATG codon

<400> 75

tctagaataa ttttgtttaa cctttaagaa ggagatatac gatg

44

<210> 76

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer #3

<400> 76
taatacgact cactatagg

19

<210> 77
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer #4

<400> 77
gctgagctgc gtgggcgc

18

<210> 78
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: complement of
Primer #4

<220>
<221> CDS
<222> (1)..(18)

<400> 78
gcg ccc acg cag ctc agc
Ala Pro Thr Gln Leu Ser
1 5

18

<210> 79
<211> 6
<212> PRT
<213> Artificial Sequence

<400> 79
Ala Pro Thr Gln Leu Ser
1 5

<210> 80
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer #5

<400> 80
ggatcctatc tgcagccaca agc

23

<210> 81
 <211> 23
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: complement of
 Primer #5

<220>
 <221> CDS
 <222> (1)..(18)

<400> 81
 gct tgt ggc tgc aga tag gatcc
 Ala Cys Gly Cys Arg
 1 5

23

<210> 82
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<400> 82
 Ala Cys Gly Cys Arg
 1 5

<210> 83
 <211> 102
 <212> PRT
 <213> Homo sapiens

<220>
 <223> CDMP-1/GDF-5

<400> 83
 Cys Ser Arg Lys Ala Leu His Val Asn Phe Lys Asp Met Gly Trp Asp
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Phe His Cys Glu Gly
 20 25 30
 Leu Cys Glu Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
 35 40 45
 Val Ile Gln Thr Leu Met Asn Ser Met Asp Pro Glu Ser Thr Pro Pro
 50 55 60
 Thr Cys Cys Val Pro Thr Arg Leu Ser Pro Ile Ser Ile Leu Phe Ile
 65 70 75 80
 Asp Ser Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
 85 90 95

Glu Ser Cys Gly Cys Arg
100

<210> 84
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> CDMP-2/GDF-6

<400> 84
Cys Ser Lys Lys Pro Leu His Val Asn Phe Lys Glu Leu Gly Trp Asp
1 5 10 15
Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Tyr His Cys Glu Gly
20 25 30
Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
35 40 45
Ile Ile Gln Thr Leu Met Asn Ser Met Asp Pro Gly Ser Thr Pro Pro
50 55 60
Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile
65 70 75 80
Asp Ala Gly Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
85 90 95
Glu Ser Cys Gly Cys Arg
100

<210> 85
<211> 102
<212> PRT
<213> Mus musculus

<220>
<223> GDF-6

<400> 85
Cys Ser Arg Lys Pro Leu His Val Asn Phe Lys Glu Leu Gly Trp Asp
1 5 10 15
Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Tyr His Cys Glu Gly
20 25 30
Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
35 40 45
Ile Ile Gln Thr Leu Met Asn Ser Met Asp Pro Gly Ser Thr Pro Pro
50 55 60
Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile

Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro Asp Ala Ala Pro Ala
50 55 60
Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile Ser Ile Leu Tyr Ile
65 70 75 80
Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
85 90 95
Glu Ala Cys Gly Cys Arg
100

<210> 88
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> CDMP-3 construct

<400> 88
Cys Ser Arg Lys Pro Leu His Val Asp Phe Lys Glu Leu Gly Trp Asp
1 5 10 15
Asp Trp Ile Ile Ala Pro Leu Asp Tyr Glu Ala Tyr His Cys Glu Gly
20 25 30
Leu Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
35 40 45
Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro Asp Ala Ala Pro Ala
50 55 60
Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile Ser Ile Leu Tyr Ile
65 70 75 80
Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
85 90 95
Glu Ala Cys Gly Cys Arg
100